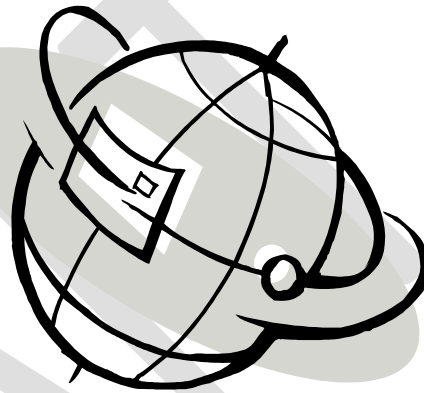


## Phase 2: Maryland Statewide Addressing Initiative Work Plan



*A partnership between State of Maryland Department of Information Technology, Salisbury University's Eastern Shore Regional GIS Cooperative, Maryland Broadband Cooperative, Towson University Center for GIS & National Telecommunications and Information Administration.*

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## Overview:

The state of Maryland was awarded funding from the State Broadband and Development Grant Program (SBDGP) administered by the National Telecommunications and Information Administration (NITA). The SBDGP, as directed by the American Recovery and Reinvestment Act (ARRA) and the Broadband Data Improvement Act (BDIA), aims to “fund projects that gather comprehensive and accurate state-level broadband mapping data, develop state-level broadband maps, aid in the development and maintenance of a national broadband map, and fund statewide initiatives for broadband planning”<sup>1</sup>. Pursuant to the data submission requirements stipulated in the *State Broadband Data and Development Grant Program Technical Appendix Clarification Document*, funding was appropriated to collect address point data statewide to support the reporting of broadband availability within census blocks greater than two square miles.

Although the initial impetus behind this data collection is to meet the reporting requirements of the SBDGP, it is recognized that a statewide address dataset would be beneficial for a number of applications throughout the State of Maryland at all levels of government, the public, and private entities. Thanks to a strong collaboration effort between the Maryland Broadband Cooperative, Eastern Shore Regional GIS Cooperative (ESRGC), and the State of Maryland Department of Information Technology (DoIT), funding from the SBDGP will be leveraged for perpetuating benefits outside the scope of mapping broadband availability.

The intent of this work plan is twofold: communicate a viable path to obtain the immediate goal of creating a standardized statewide address point file to meet the requirements of the SBDGP, and to foster a program that allows the address database to be maintained, accessible, and utilitarian. Although a framework can be built to accomplish these tasks, the work plan will likely need to be fluid and adaptive. It is anticipated that the project may be received with various levels of enthusiasm impacting cooperation. Data structure, accuracy, currency and completeness will also vary with each jurisdiction and anticipating these characteristics is difficult without seeing the data firsthand. Nevertheless it is important to develop a foundation in which the addressing project can build upon.

## Goal:

To leverage existing and ongoing investments in geospatial address collection and maintenance for local, regional and statewide benefit. Promote collaboration and coordination at local, regional, and state agencies to foster ongoing relationships for the sake of a maintained database of georeferenced addresses for the State of Maryland.

## Objectives:

1. Collect existing address point data from local jurisdictions throughout Maryland.
2. Validate local data against statewide datasets and report findings back to local governments.
3. Define a common data model and transition collected data to the defined schema.
4. Identify and determine needed resources for a repeatable process for gathering and storing the address point data for the State of Maryland.
5. Identify areas of the State which address coverage and accuracy can be improved and identify funding to accomplish these improvements.
6. Publish one or more services for the public which rely on the collected address database (geocoding service, web-mapping service, etc.).

## Potential Benefits:

1. Leverages existing investments.
2. Increases the accuracy of mapping broadband availability.
3. Increases administrative accuracy at state, regional, and local jurisdictions.
  - a. Streamline enumeration within boundaries for the proper provision of services and taxation.

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<sup>1</sup> State Broadband Data and Development Grant Program, Notice of Funds Availability and Solicitation of Applications, 74 Fed. Reg. 32545 (July 8, 2009) (Notice).

4. Supports emergency response services.
  - a. Assists with dispatch along jurisdictional boundaries and inter-jurisdictional responders.
  - b. Assists with disaster preparedness and damage assessment.
5. Reduces redundant data requests among local governments.
6. Provides local governments with feedback and potentially ongoing assistance with address collection.
7. Enables a standardized, accurate statewide geocoding service.

## Project Scope:

Since 2007, Towson University Center for GIS (CGIS) has been leading an initiative to coordinate the collection of local road centerline data for the state of Maryland. One of the goals of this project is to provide a unified, statewide road centerline that supports addressing needs. In an effort not to confuse the two projects, this current effort will be referred to as phase two of the original addressing initiative (hereafter referred to as the “addressing project”). Phase two will augment this goal by collecting address point data from local jurisdictions to provide a unified address point database for improved addressing needs and other analytical purposes. The primary purpose of this project is the development of a statewide address point feature class, formatted to industry best practices and suitable for supporting the necessary address-matching requirements of the Maryland Broadband Mapping Initiative. The funding for this effort will be leveraged for benefits outside the spectrum of mapping broadband availability. The addressing project will be broken down into five phases: initial outreach, data collection, data verification/analysis, data standardization, identify address improvement plan, and finalize addressing services and updating process. The following section will further explain each phase. This section will set forth a tentative timeline, outline detailed tasks, and propose a general approach to each of the six phases listed in the previous section. Although each phase is listed sequentially, it is reasonable to assume that timelines for phases and tasks within phases may be adjusted.

### Phase 1- Initial Outreach:

At the outset of the addressing project, it is vital that addressing stakeholders are approached to communicate the state’s intentions. This will include reaching out to federal, regional, and local representatives throughout the state. It is anticipated that outreach will occur throughout the project, however the dynamic and strategy is important at the beginning. Communication is vital in order to incorporate the needs of a diverse set of stakeholders into the project’s development. To date several state, regional, and local stakeholders have been approached including the Emergency Number Systems Board, Maryland Department of Planning, Maryland State Highway Administration, Baltimore Metropolitan Council, Tri-County Council for the Lower Eastern Shore of Maryland, and Talbot and Howard Counties and the City of Baltimore. The project coordinator has also reached out to federal agencies including the Federal Geographic Data Committee (FGDC) and the National States Geographic Information Council (NSGIC). It is anticipated that the Census Bureau and United States Postal Service will be contacted as the project progresses.

The project coordinator will organize a meeting between local GIS coordinators and PSAP 9-1-1 center representatives to discuss the ongoing addressing project in detail following the mailing of a data request letter. It is the intent of the project coordinator to visit each jurisdiction by the end of April, 2013. Information to be gathered includes gauging the local jurisdiction’s interest in participating, local addressing workflows, processes and data structures, and other addressing needs or unrealized benefits. A project overview brochure will be developed as a means to communicate basic project information to the public and stakeholders. The tentative timeline for phase one is as follows:

- February 22, 2013: Data request letter is mailed to local jurisdictions.
- March 1 – 8, 2013: Follow-up phone calls are made to schedule meetings.
- March 4<sup>th</sup> – April 12, 2013: Meetings held with local jurisdictions. Data can be provided at this time.

## Phase 2 – Data Collection

In an effort to leverage existing expenditures and efforts, avoid duplication, and avoid burdensome data requests to local governments, the addressing project is coordinating with the Maryland Department of State Police's effort to upgrade their call taking abilities at the barracks. The addressing project is being leveraged as a platform to encourage data sharing between local governments and the State of Maryland. Ancillary data including centerlines and building footprints will be requested from local governments. A yet to be determined upload site will be provided to expedite data collection. Alternatively, the data will be collected at the time of the meeting between the project coordinator and the local jurisdictions. Due to the partnership with Maryland State Police, statewide data collection is anticipated to be completed by April 15<sup>th</sup>. This will also mark the conclusion of the local outreach meetings (see previous phase).

## Phase 3 – Data Analysis/Verification

To bolster the addressing partnership between the State and the local jurisdictions, feedback will be provided to the local governments. Feedback may include a list of addresses from state databases such as voter registration and motor vehicles that do not successfully match to the supplied addresses. No personal information will be exchanged, only the fact that an address record exists in a state database, that cannot be verified against the local address file. Other feedback can be provided if requested, providing it is deemed appropriate and feasible within a reasonable timeframe.

Additional analysis will provide a snapshot of the various data structures throughout the State. Point placement, attributes, and database schemas will be documented for each county. This will provide detailed documentation to estimate addressing improvement costs in the future. Data examination will also provide the necessary attribute crosswalks for the data standardization process. The tentative timeline for phase three is as follows:

- April 15 – 29, 2013: Work with state agencies to obtain address lists (MVA, Maryland State Board of Elections)
- May 1 – 20, 2013: Geocode statewide datasets against local data.
- May 20 – June 24: Summarize validation findings for each county and report back to local representatives.
- May 20 – June 24: Document data structures for each county.

## Phase 4 – Data Standardization

A major component of delivering a statewide address point file is standardization. It is anticipated that each local jurisdictions will have different formats tailored to internal processes and workflows. There are several industry address standards including ones commissioned by the United States Postal Service, the National Numbers Association, and FGDC. The standard largely depends on the intended use, and until recently, focused on non-spatial aspects. With the advent of GIS, determining spatial standards is also necessary (point placement, many-to-one relationships, etc.). At this time it is unclear if FGDC's United States Thoroughfare, Landmark, and Postal Address Data Standard includes spatial aspects. Currently there is a NENA working group that is developing a revised GIS data model which includes address points. In order to expedite data dissemination to the public via iMAP, an interim simplified standard will be developed to merge the datasets. This will allow an initial publication of the address data in August, 2013. A more thorough long term standard that entails point placement, and secondary address syntax should also be adopted.

At this point in the project, it is advised that a statewide addressing workgroup is formed with stakeholders from multiple industries throughout the State. Although a simple determination could be made to adopt an existing standard, feedback from stakeholder from a variety of stakeholders would be beneficial. Adopting a federal standard would allow for a hierarchical data aggregation process from the local to the federal level. A federal standard could impose a very complex data model, however, that may be impractical with 24 disparate datasets. Local governments should not be expected to adhere to the standard, but rather serve as a "best practice" for addressing. Once a standard is adopted, an extract, transform and load (ETL) process can be developed either internally or through

contracting. Once the datasets are standardized, they will be merged into a single layer. At this time a copy of the file will be transmitted to ESRGC for broadband reporting. Also at this time it is anticipated that basic map services can be provided on the existing iMAP infrastructure. The tentative timeline for phase 4 is as follows:

- June 1, 2013: Send out invitations to join statewide addressing workgroup.
- July 1 – 15, 2013: Research existing standards and contact existing workgroups for updates on upcoming standards.
- Late July, 2013: Convene addressing work group to discuss statewide standard.
- August 1, 2013: Merge datasets to a simplified standard and publish to iMAP.
- August 20, 2013: Adopt a long term, robust addressing standard.
- September 20, 2013: Develop data model, ETL process, and merge datasets.
- October 1, 2013: Submit dataset to ESRGC.

## Phase 5 – Identify Address Improvement Plan

The effort undertaken to collect and analyze local government address data provides a unique opportunity to prepare an address improvement plan. Evaluating the quality of the dataset can involve multiple components and depend on the depth of the standard adopted. According to the International Organization of Standardization (ISO), the quality of a spatial database should be evaluated against the following elements and sub-elements<sup>2</sup>:

- completeness – presence and absence of features, their attributes and relationships;
  - commission – excess data present in a dataset
  - omission – data absent from a dataset
- logical consistency – degree of adherence to logical rules of data structure, attribution and relationships (data structure can be conceptual, logical or physical);
  - conceptual consistency – adherence to rules of the conceptual schema,
  - domain consistency – adherence of values to the value domains,
  - format consistency – degree to which data is stored in accordance with the
  - physical structure of the dataset
  - topological consistency – correctness of the explicitly encoded topological characteristics of a dataset.
- positional accuracy – accuracy of the position of features;
  - absolute or external accuracy – closeness of reported coordinate values to values accepted as or being true,
  - relative or internal accuracy – closeness of the relative positions of features in a dataset to their respective relative positions accepted as or being true,
  - gridded data position accuracy – closeness of gridded data position values to values accepted as or being true.
- temporal accuracy – accuracy of the temporal attributes and temporal relationships of features;
  - accuracy of a time measurement – correctness of the temporal references of an item (reporting of error in time measurement),
  - temporal consistency – correctness of ordered events or sequences, if reported,
  - temporal validity – validity of data with respect to time
- thematic accuracy – accuracy of quantitative attributes and the correctness of non-quantitative attributes and of the classifications of features and their relationships;
  - classification correctness – comparison of the classes assigned to features or their attributes to a universe of discourse (e.g. ground truth or reference dataset),

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<sup>2</sup> Measuring Data Quality, A Report to the Geography Division, U.S. Bureau of the Census Deliverables #11 & 12 - Syneren Technologies Contract – Task T005, (December 29, 2010).



- non-quantitative attribute correctness – correctness of non-quantitative attributes (e.g. correctness of attribute values such as “road name” or “pavement type”),
- quantitative attribute accuracy – accuracy of quantitative attributes.

These elements are very robust and concern for each element may not be appropriate. Nonetheless it is important to specify a quality assurance framework when evaluating statewide data for potential improvements. Gaps can be identified for each jurisdiction throughout the state and clearly communicated to prospective contractors. It appears from early assessments that although most counties have some form of geospatial address data, secondary address information is largely incomplete. Examples of secondary addresses include apartment units, office suites, and other ancillary locational information. Other counties may need assistance with field verification and spatial accuracy. Funding for improvement activities is not currently procured and will have to be identified from sources including the Emergency Number Systems Board and other state agencies. Additional funding may become available particularly with the Census’ Geographic Support System Initiative. The tentative timeline for phase four is as follows:

- November 30, 2012: Synthesize the state of address data across Maryland. Synthesize the state of address data across Maryland
- December 1 – 30, 2013: Approach potential funding agencies with improvement plan and need to upgrade addressing quality and robustness.
- Early 2014: Contingent upon funding, write and submit RFPs to prospective contractors for addressing improvement.

## Phase 6 - Finalize Addressing Services and Updating Process

The addressing project will be deemed a success not by creating a static database for broadband reporting, but rather an up-to-date dataset accessible for multiple applications. The existing iMAP infrastructure will be leveraged immediately once the data is standardized and merged. Additional applications, however, could be developed that allow for seamless updating by local jurisdictions, public inquiry, and facilitation of state agency workflows. This part of the project will once again require input from stakeholders. Outreach will also focus on reaching out to other state agencies to determine if specific tools and geoprocessing models could be built to support internal workflows.

The breadth and complexity of addressing services could vary widely depending on available resources and time constraints. Maintaining the address dataset could entail a simple process such as collecting local data via an FTP site when updates are available, to a more sophisticated online editing approach. Citizens could query an address to determine school assignment, voting district, business development incentives, and other spatial characteristics. An application could be built to allow for citizen input regarding a particular address’ accuracy. A standardized statewide address database could also facilitate analysis across systems and agencies. Getting buy-in from other state agencies as to the benefit of the master address database will be important. It is anticipated that applications and services will be developed throughout the second year of the project in 2014. The robustness of such applications will depend on funding and time constraints. Nevertheless a continued effort to reach out to stakeholders will commence throughout 2014.

## Conclusion:

Phase 2 of the Maryland Statewide Addressing Initiative seeks to leverage previously disparate investments at the state and local levels for statewide benefit. It is the intent of the project to make this a “win win” situation at the state and local levels. Success will not be defined by collecting a one-time static address dataset, but rather a living, breathing address dataset that relies on ongoing relationships at the state and local levels. The addressing project is a symbolic effort to incentivize data sharing between the State and local jurisdictions. It will be an evolutionary process in which the dataset will grow and mature as more users are engaged with the dataset. It is anticipated that multiple unrealized benefits will arise and the return on investment will be significant.